# APPLICATION FOR LETTERS PATENT OF THE UNITED STATES

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## SPECIFICATION

To all whom it may concern:

Be It Known, That we, PAUL C. BLANK and MARK E. KEETON, of LaCrosse, WI and Kettering, OH, respectively, have invented certain new and useful improvements in COLUMNAR ADHESIVE LABEL ROLL, of which we declare the following to be a full, clear and exact description:

# COLUMNAR ADHESIVE LABEL ROLL

## BACKGROUND OF THE INVENTION

**[0001]** The present invention relates generally to stationery products, and, more specifically, to adhesive labels.

**[0002]** The ubiquitous adhesive label is available in a myriad of configurations for use in various applications, including specialty applications. The typical adhesive label includes pressure sensitive adhesive on its back side initially laminated to an underlying release liner. The release liner is typically coated with silicone to provide a weak bond with the adhesive for permitting the individual removal of labels from the liner when desired.

**[0003]** Adhesive labels may be found in individual sheets, or joined together in a fan-fold stack, or in a continuous roll. Label rolls are typically used in commercial applications requiring high volume use of labels.

**[0004]** More specifically, in the fast food industry specialty labels may be used in identifying individual food products in typical sales transactions. The label roll may be formed of thermal paper for sequential printing of individual labels in a direct thermal printer. Or, a thermal transfer printer may also be used.

**[0005]** The typical pressure sensitive adhesive label includes full surface adhesive on its back side which may interfere with the handling thereof during the food preparation process. An individual label identifying the corresponding food product is removed from the printer by the user who typically wears sanitary gloves. The label may inadvertently bond to the gloves, and this increases the difficulty of placing the label on the packaging for the intended food product.

**[0006]** Furthermore, the liner material used in the label roll results in waste, and correspondingly affects the cost of the roll. Linerless label rolls are conventionally known in which the front surface of the label web may be coated with a suitable release material, such as silicone, for providing an integrated liner in the web itself without the need for an additional liner sheet.

[0007] However, as the linerless web is unwound in the printer, the back side adhesive is exposed to the various parts of the printer and can inadvertently bond thereto leading to undesirable jamming of the printer.

[0008] Furthermore, the printer may include a typical cutting knife or cutting bar for cutting individual labels from the continuous web. The exposed adhesive on the linerless label roll therefore permits adhesive buildup on these cutting elements during prolonged operation of the printer.

[0009] Adhesive buildup on any of the various components of the printer contacting the adhesive side of the label is undesirable because it requires periodic cleaning or other maintenance to avoid printer jamming, which may nevertheless occur.

[0010] Accordingly, it is desired to provide an improved linerless label roll.

## BRIEF SUMMARY OF THE INVENTION

[0011] A label roll includes a web having front and back surfaces wound in a roll. The back surface includes adhesive patches aligned in a column along the running axis of the web. The front surface includes a release strip behind the column of patches and laminated thereto in successive layers in the roll.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The invention, in accordance with preferred and exemplary embodiments, together with further objects and advantages thereof, is more particularly described in the following detailed description taken in conjunction with the accompanying drawings in which:

[0013] Figure 1 is an isometric view of a thermal printer dispensing pressure sensitive labels in an exemplary application.

[0014] Figure 2 is a side elevational internal view of the printer shown in Figure 1 illustrating exemplary components along the feedpath of the label roll mounted therein.

[0015] Figure 3 is a top view inside the printer illustrated in Figure 2 showing dispensing of

the label roll therethrough.

**[0016]** Figure 4 is a isometric view of the label roll illustrated in Figures 1-3 in accordance with an exemplary embodiment.

**[0017]** Figure 5 is a back side view of the label roll illustrated in Figure 4 in more detail.

**[0018]** Figure 6 is a back side view of a portion of the label roll in accordance with an alternate embodiment.

**[0019]** Figure 7 is a front side view of a portion of the label roll in accordance with an alternate embodiment.

**[0020]** Figure 8 is a back side view of a portion of the label roll in accordance with an alternate embodiment.

## DETAILED DESCRIPTION OF THE INVENTION

**[0021]** Illustrated in Figure 1 is a conventional printer 10 configured for printing in sequence individual labels 12 for use in an exemplary fast food application. For example, food may be placed in a suitable food package 14 such as the paper box illustrated, or simple wrapping paper (not illustrated).

**[0022]** Print or identifying indicia 16 is printed on the label in the printer for identifying the contents of the package, for example. The individual printed label may then be removed from the printer and applied to the food package 14 as illustrated in the exemplary method shown in Figure 1.

**[0023]** Figure 2 illustrates certain elements along the feedpath of the printer 10, which may otherwise have any conventional configuration, such as a direct thermal printer, or alternatively a thermal transfer printer. A label roll 18 is suitably mounted inside the printer either in a tray therefor, or on a support spindle extending through the center core thereof. The roll includes a continuous, elongate web 20 spiral wound in a multitude of overlapping layers or laminations.

**[0024]** The web 20 is dispensed from the roll inside the printer illustrated in Figures 2 and 3 along a suitable feedpath. The feedpath may include a pair of web guides 22 aligned

transversely with each other on opposite sides of the web for guiding the web as it is dispensed through the printer. A platen roller 24 is disposed downstream of the guides and suitably engages the web for pulling the web forward through the printer for dispensing.

**[0025]** Disposed above the platen roller 24 is the printing head 26 which may have any conventional configuration, such as a thermal head assembly for use in direct thermal printing of the web which may be formed of suitable thermal paper. Alternatively, a thermal transfer ribbon ((not shown) may be used with ordinary printing paper for the web.

**[0026]** Disposed at the outlet end of the printer illustrated in Figures 2 and 3 is a suitable cutting blade 28 which may have any conventional configuration. In the exemplary embodiment illustrated in these Figures, the cutting blade 28 is rotatably mounted on a roller for suitably cutting the web along a straight line across its full width during operation. In an alternate embodiment, the cutting blade may be stationary, with the user simply tearing or cutting the dispensed label along the blade in a typical manner.

**[0027]** The exemplary printer illustrated in Figure 3 also includes an index sensor 30 for sensing a suitable index mark contained on the web, if desired. Index sensors are conventional, and typically are optical components which detect a suitable mark on the web for permitting precise cutting of the individual labels 12 for the intended size. The cutting blade 28 is typically indexed with the platen roller 24 for coordinating the operation thereof. In this way, the distance between the cutting blade and the index sensor 30 is known and permits precise cutting of the web along the longitudinal or running axis 32 thereof during operation.

**[0028]** The label roll 18 in the printer shown in Figures 1-3 is illustrated in more particularity in isolation in Figure 4. The web 20 is preferably a single ply sheet of suitable label material, such as thermal paper. The web includes a front or top surface 34 which is mounted in the printer illustrated in Figure 2 facing upwardly for being printed by the printing head 26. The web also includes an opposite back or bottom surface 36. The web is wound in the roll 18 in a spiral having a multitude of overlapping layers or laminations in which the back surface 36 is laminated against the front surface 34 of the upstream portions or inner layers of the web.

[0029] The back surface 36 illustrated in Figure 4 includes a plurality of repeating adhesive spots or patches 38 aligned in, and spaced apart along, a column extending along the longitudinal running axis 32 of the web. The adhesive patches 38 may have any conventional composition such as the typical pressure sensitive adhesive which may be formulated for permanent bonding or temporary bonding to the intended surface, such as the package 14 illustrated in Figure 1. In the preferred embodiment, the adhesive patches 38 effect weak bonds with the food package 14 to permit the repositioning of the individual labels without tearing of the label upon being removed from a surface.

[0030] Instead of providing full surface coverage of the adhesive on the back surface 36 illustrated in Figure 4, the adhesive is provided solely in small patches in a relatively minor area of the back surface, with the remaining major area of the back surface being devoid of adhesive. In this way, the substantial reduction in surface area of the adhesive correspondingly decreases the buildup of adhesive inside the printer illustrated in Figure 2 for increasing the time between any maintenance required therefor.

[0031] As further illustrated in Figure 4, the front surface 34 of the roll includes a release strip 40 which extends along the running axis directly behind the column of adhesive patches 38. The release strip may be formed of any suitable releasing material, such as cured silicone or acrylic suitably coating or impregnating the web front surface. In this way, the column of adhesive patches 38 may be laminated to the release strip 40 in the successive layers of the roll illustrated in Figure 4 without the need for a separate liner. The single ply web wound in the roll 18 is therefore linerless.

[0032] Accordingly, when the linerless roll is mounted in the printer illustrated in Figure 2, the adhesive-less front surface 34 preferably faces upwardly to engage the web guides 22 and the printing head 26 for preventing adhesive contact therewith. The adhesive back surface 36 faces downwardly and is suitably spaced from adjacent portions of the feedpath for preventing inadvertent bonding therewith. The platen roller 24 is preferably coated with a suitable non-stick material such as polytetrafluoroethylene, typically known by the Teflon trademark brand material.

[0033] The non-stick platen roller 24 will therefore suitably drive or pull the web along its

feedpath in the printer to permit individual labels 12 to be cut therefrom at the cutting blade 28 disposed immediately downstream from the platen roller. Since the adhesive patches 38 cover a relatively small portion of the area of the back surface 36, buildup of adhesive on the cutting blade 28 is correspondingly reduced, and limited to the small region aligned with the adhesive patches. Periodic maintenance for removing any adhesive buildup is therefore made easier, or adhesive accumulation may be insignificant within the life of the printer itself.

**[0034]** As shown in Figure 4, the adhesive patches 38 are preferably aligned parallel along one lateral edge of the web 20, and closer thereto than to the opposite lateral edge of the web. In this way, the adhesive is isolated along only one edge of the web, with the remainder of the back surface 36 being devoid of the adhesive.

**[0035]** A particular advantage of the this columnar adhesive configuration is that most of the individual label 12 as illustrated in Figure 1 is without adhesive and permits ready handling thereof, even by users wearing gloves, with little chance of grabbing the adhesive patch itself. The isolated adhesive patch may then be used for bonding the entire label to the package 14, in a cantilever fashion for example, for permitting grasping thereof for removal and repositioning of the label if desired.

**[0036]** In the preferred embodiment illustrated in Figures 3 and 4 for example, the web 20 is continuous along the running axis, and imperforate without perforations or die cuts. The individual labels 12 may then be defined by the configurations of the adhesive patches 38 and corresponding cutting of the labels by the cutting blade 28 illustrated in Figure 2.

**[0037]** In the preferred embodiment illustrated in Figures 4 and 5, the patches 38 are oval, with major axes disposed parallel to the running axis 32. The patches are identical to each other and repeat along the column thereof. The individual patches have convex leading edges, convex trailing edges, and straight side edges extending therebetween.

**[0038]** A particular advantage of this configuration is the smooth transitioning of the adhesive patches as they travel over the rotating platen roller 24 illustrated in Figure 3 during operation. The adhesive on the convex leading edge of the patches transitions onto the roller with increasing width, and then leaves the roller with decreasing width for distributing the adhesive forces therebetween during operation.

[0039] In the preferred embodiment illustrated in Figures 4 and 5, the web 20 further includes a plurality of repeating index or sensor marks 42 disposed between corresponding ones of the adhesive patches 38 to define corresponding labels 12 each having a single adhesive patch. The index mark 42 may have various configurations, such as the black line which extends across the full width of the web in Figures 4 and 5.

[0040] During operation, the index mark 42 illustrated in Figure 4 is disposed on the web back surface 36 and faces downwardly in Figure 3 toward the index sensor 30. As each index mark passes over the index sensor 30 during operation, it is detected thereby. The computer controller of the printer then ensures that the cutting blade 28 is coordinated with the transport of the platen roller 24 for precisely cutting the web longitudinally between successive adhesive patches 38 in this exemplary configuration.

[0041] The index marks 42 may be located at any longitudinal position on the web such as between the adjacent adhesive patches, which permits the line marks 42 to provide the top and bottom edges of the individual labels once they have been cut from the web.

[0042] Figure 6 illustrates an alternate embodiment of the label roll in which the adhesive patches 38B are rectangular instead of oval. In this embodiment, the rectangular patches have straight side edges aligned parallel with the running axis 32, and are closely adjacent to one edge of the web. The rectangular patches also have straight leading edges and trailing edges extending transversely or perpendicular to the running axis 32 of the web.

[0043] The rectangular adhesive patches 38B illustrated in Figure 6 are preferably elongate along the running axis 32 and are taller or longer along that axis than they are wide transverse thereto. In this embodiment, the corresponding index marks 42 are also used between the adjacent rectangular patches 38B to define the corresponding labels 12, with each label having a single rectangular patch. Like the oval patch 38 illustrated in Figure 5, the rectangular patch 38B is aligned closely along only one edge of the web leaving the majority of the remaining web adhesive-free.

[0044] In both embodiments illustrated in Figures 5 and 6, the release strip 40 is the same and covers completely the web front side 34 in full. The silicone release coating of the full area strip 40 protects the underlying printing formed in the thermal paper in the thermal

printing process.

**[0045]** Figure 7 illustrates an alternate embodiment for the release strip, designated 40B, which is narrow and conforms in width slightly wider than the column of the adhesive patches 38 illustrated in Figure 5, or with the column of rectangular patches 38B illustrated in Figure 6 if desired. This leaves the remainder of the web front side 34 devoid or free of any release material. This embodiment may be useful for thermal transfer printing in which a transfer ribbon is suitably provided between the printing head and the exposed front surface 34 of the web to the side of the narrow release strip 40B.

**[0046]** Figure 8 illustrates yet another embodiment in which rectangular adhesive patches 38C are elongate transverse to the running axis 32 and are shorter in height along the running axis than they are wide transverse to the running axis. In this way, a column of relatively small rectangular patches may be used instead of the larger rectangular patches 38B illustrated in Figure 6.

**[0047]** The embodiment illustrated in Figure 8 is preferably devoid of the index marks between the small patches 38C for permitting variable label size if desired. For example, the web 20 may include a plurality of the labels 12 defined therein, with each label having a plurality of the small adhesive patches 38C.

**[0048]** The small patches increase the number of adhesive-free spaces between the patches in which the web may be cut for defining the size of the individual labels 12. Preferably the web is cut in the areas devoid of adhesive to reduce buildup of adhesive on the cutting blade.

**[0049]** In the various embodiments disclosed above, the small adhesive patches reduce the area of adhesive, and correspondingly reduce the associated problems of the adhesive during installation and operation of the linerless label roll in the printer. Reduced area adhesive correspondingly reduces the portions of the printer subject to adhesive buildup. The columnar alignment of the adhesive patches isolates any adhesive buildup to a minor portion of the printer feedpath, and correspondingly reduces the required maintenance therefor.

**[0050]** The train of separated adhesive patches permits cutting of the labels in the adhesive-free spaces for reducing adhesive buildup. And, if individual labels are cut along the adhesive patches themselves, subsequent cutting of labels in the adhesive-free zones

provides a form of self-cleaning of the cutting blade.

**[0051]** While there have been described herein what are considered to be preferred and exemplary embodiments of the present invention, other modifications of the invention shall be apparent to those skilled in the art from the teachings herein, and it is, therefore, desired to be secured in the appended claims all such modifications as fall within the true spirit and scope of the invention.

**[0052]** Accordingly, what is desired to be secured by Letters Patent of the United States is the invention as defined and differentiated in the following claims in which we claim: